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FIVE NEW PEACH VARIETIES ESPECIALLY ADAPTED TO MILD WINTERS^{1, 2}

J. W. LESLEY³

IN CLIMATIC REGIONS well adapted to the growth of subtropical fruit trees, most varieties of peaches are subject to delayed foliation, more appropriately termed prolonged dormancy. The flower and leaf buds remain dormant long after the coming of warm spring weather, and eventually the flower buds may drop. A partial or total crop failure may ensue. Peaches require a certain amount of chilling to complete their rest period, and delayed foliation and blooming are caused by insufficient chilling.⁴ This chilling requirement is likely to be satisfied by about two months' exposure to temperatures between 32° and 48° Fahrenheit. A slight deficiency of chilling may prove beneficial by delaying and extending the period of blooming and so reducing the frost hazard.

At Riverside, California, injury from insufficient chilling has occurred in nine of the fifteen years, 1924-1938. In 1934, from this cause, most varieties failed entirely, but in 1936 and 1938 only varieties that require much chilling were injured.

Peach varieties differ widely in chilling requirement and, consequently, in susceptibility to prolonged dormancy, as was long ago observed.⁵ Varieties of the South China and Peento groups require relatively little chilling and are, accordingly, termed resistant; but most of the varieties of these groups that have been tried in California are seriously defective in other respects. Chilling requirement is a quantitative character having a definite genetic basis and depending on several genes. The F₁, or first-generation hybrids, tend to be intermediate in chilling requirement between the parents, but distinctly more like the parent that requires less chilling.

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² Paper No. 401, University of California Citrus Experiment Station, Riverside, California.

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⁴ Chandler, W. H., M. H. Kimball, G. L. Philp, W. P. Tufts, and Geo. P. Weldon. Chilling requirements for opening of buds on deciduous orchard trees and some other plants in California. California Agr. Exp. Sta. Bul. 611:1-63. 1937.

⁵ Horne, Wm. T., Geo. P. Weldon, and E. B. Babcock. Resistance of peach hybrids to an obscure disease in southern California. Jour. Heredity 17:98-104. 1926.

ORIGIN OF THE VARIETIES

Peach hybridization was begun by E. B. Babcock at Whittier, California, in 1907 with the aim of combining better fruit characters with the adaptation to warm winters possessed by varieties of the Honey and Peento groups. C. O. Smith collaborated in the early stages of this work. In 1921 and 1922 the fruit characters of the resulting seedlings were carefully observed by H. B. Frost and C. O. Smith at the Citrus Experiment Station, Riverside. In 1924, 30 of these hybrids were selected by H. B. Frost and the writer as worthy of further consideration. One of these selected hybrids was recognized by Geo. P. Weldon, pomologist, Chaffey Junior College, Ontario, California, as highly promising and was introduced in 1933 as the Babcock peach.⁶

When breeding was resumed at the Citrus Experiment Station in 1927, the plants used for this purpose were (1) the most promising seedlings obtained from the early work; (2) several varieties collected by the Division of Plant Exploration and Introduction of the United States Department of Agriculture and having comparatively little chilling requirement; and (3) some standard commercial varieties. The pollen for crossing was collected from flowers that opened in the laboratory, and all flowers, either cross- or self-pollinated, were enclosed in paper bags. About 1,000 seedlings originating from this material have now fruited, and from these, the five new varieties described in the present paper have been selected as promising for commercial planting on a small scale and for the home garden.

The descriptions of these new varieties are based upon observations made on the original seedling trees and in most cases on a few trees top-worked to each variety. No data are available from bearing trees grown under commercial-orchard conditions. These varieties require relatively little chilling and are not likely to be seriously affected by prolonged dormancy in the citrus-growing region of southern California. In a much milder climate, like that of southeastern Florida, the amount of chilling might be insufficient for these varieties. On the other hand, they may not prove sufficiently hardy to withstand the low temperatures of a very cold winter or a cold snap in spring following a mild winter. Rosy, Ramona, Hermosa, and Sunglow probably require slightly more chilling than Babcock; Golden State requires distinctly more. At Riverside, these new varieties, like the Babcock and all other varieties requiring little chilling, regularly bloom and leaf early (figs. 1 and 2).

⁶ Weldon, Geo. P., and J. W. Lesley. The Babcock peach. California Agr. Exp. Sta. Cir. 328:1-5. 1933. (Out of print.)

No actual measurements of the chilling requirement of the new peach varieties are available, but their chilling requirement has been estimated by comparing their behavior with that of standard varieties in several seasons of prolonged dormancy. For this purpose, Elberta and Babcock were used chiefly, their behavior in southern California being fairly



Fig. 1.—A peach tree of the Maxine variety, photographed at Riverside, May 10, 1938. It shows late leafing and mild prolonged dormancy symptoms in a variety requiring fairly long chilling.

well known. Elberta is distinctly susceptible to prolonged dormancy since it requires fairly long chilling, though not so long as such varieties as Mayflower and Alexander. Babcock requires very much less chilling than Elberta and is similar in this respect to some varieties of the South China or Honey group. At Riverside, Elberta failed totally to produce a crop one year and failed partially five times in the past ten years; whereas Babcock produced a full crop even in 1934, probably the worst season of prolonged dormancy on record in southern California.

In a season of prolonged dormancy, a peach variety that has been insufficiently chilled tends, as a rule, to mature the bulk of its crop (if any) relatively later than a variety that has been sufficiently chilled. For instance, at Riverside in 1937, when chilling had been sufficient

for all varieties, Elberta ripened only four days later than Rosy; but in 1938, after less chilling, it ripened ten days later. Similarly, in 1937, Golden Jubilee, which requires only slightly less chilling than Elberta, ripened nearly two weeks before Babcock; but in 1938 it ripened about the same date.



Fig. 2.—Rosy, a new peach variety photographed at Riverside, May 10, 1938. This shows the uniform, early leafing of a variety requiring little winter chilling.

In preliminary tests by Dr. L. C. Cochran, the new freestone varieties, Rosy and Golden State, proved distinctly susceptible to peach mosaic; in two separate tests the cling, Ramona, seemed little affected.

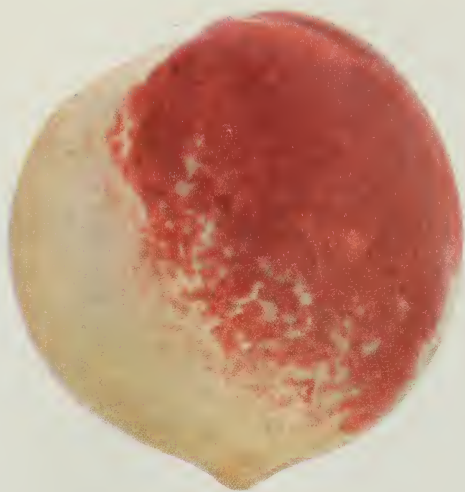
The distribution of trees, scions, or buds of the new varieties is restricted by a quarantine regulation of the State of California concerning peach mosaic disease, although a recent regulation provides a mode of procedure whereby new varieties may eventually be moved out of the quarantined area. A limited number of buds, however, are available to growers and nurserymen within the generally infected area.

The general plan used in description of varieties in *The Peaches of New York*⁷ has been adopted here. In describing flesh texture and leaf

⁷ Hedrick, U. P., G. H. Howe, O. M. Taylor, and C. B. Tubergen. The peaches of New York. New York (Geneva) Agr. Exp. Sta. Rept. 1916(II):1-541. 92 colored plates. 1917.

PLATES





A



B

Plate 1.—*A*, The Rosy peach ($\frac{7}{8}$ natural size) ; *B*, the Golden State ($\frac{6}{7}$ natural size).



Plate 2.—Rosy, a white-fleshed, freestone peach, which ripens in midseason. ($\frac{9}{10}$ natural size.)

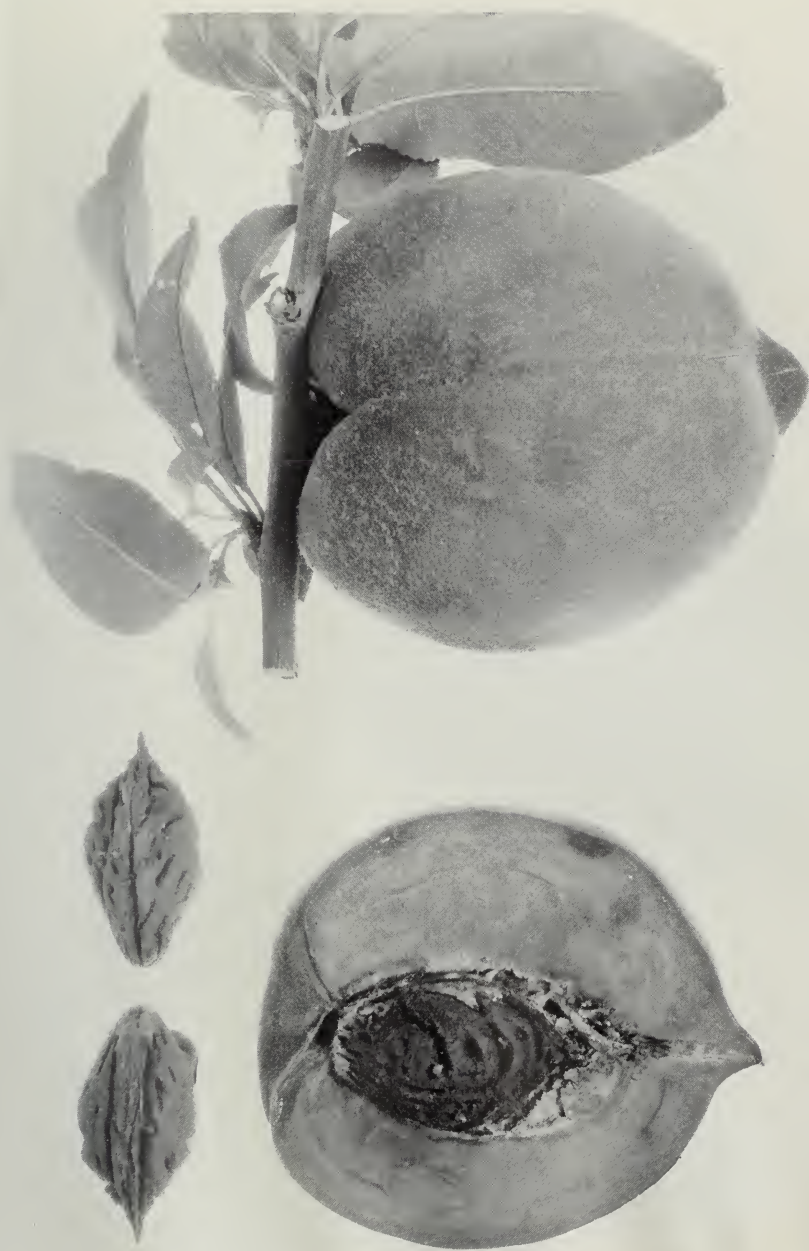


Plate 3.—Golden State, a yellow-fleshed, freestone peach which ripens in midseason and requires slightly more winter chilling than the other four new varieties. ($\frac{5}{16}$ natural size.)



Plate 4.—Ramona, a late, yellow-fleshed, clingstone peach, which is suitable for canning. ($\frac{9}{10}$ natural size.)



Plate 5.—Hermosa, a firm, white-fleshed freestone peach which ripens in midseason. In flavor it resembles the Babcock variety. ($\frac{6}{7}$ natural size.)

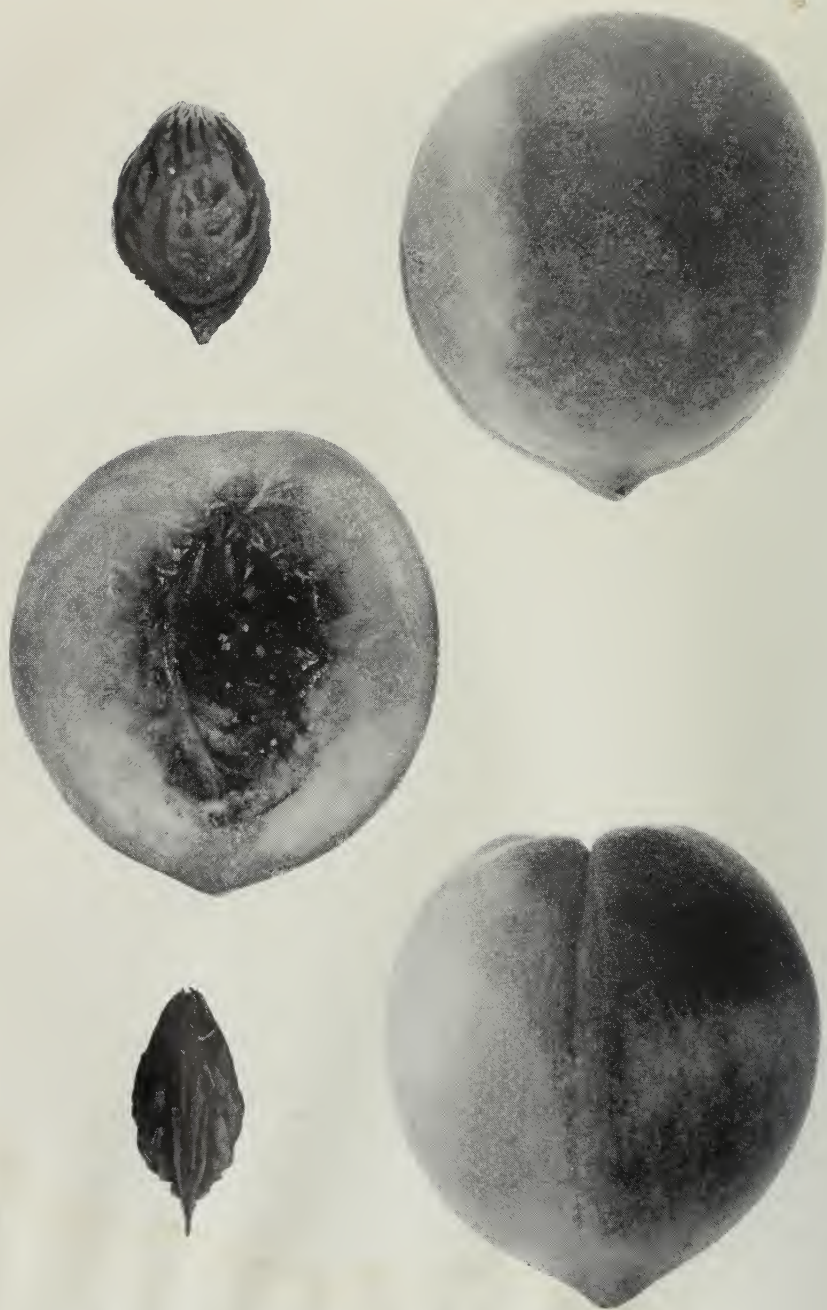


Plate 6.—Sunglow, a midseason freestone peach which has orange-yellow flesh of very good quality. ($\frac{9}{10}$ natural size.)

shape, the terminology of Blake⁸ and of Sefick and Blake⁹ has been used. Flower-color references are to Ridgway's *Color Standards and Color Nomenclature*.¹⁰ Large, well-developed leaves from the middle nodes of vigorous outside shoots were selected for observation. The fruits and stones measured were typical, well-developed specimens from trees with a heavy crop.

ROSY

Rosy (plates 1, 4, and 2) is an attractive, white-fleshed, freestone peach which ripens in midseason. The quality is very good, the texture firm-melting, and the aroma of the pleasing kind often associated with white flesh. Rosy appears to have the requisite size, firmness when fully ripe, and keeping quality for shipping. It originated in 1932 and set its first crop, consisting of two fruits, in 1935. In 1936 the seedling tree produced a full crop but in 1937 only a light crop. In 1938, when varieties requiring long chilling failed to produce a satisfactory crop, the original Rosy tree and another top-worked to Rosy produced heavy crops. This peach probably requires slightly more chilling than Babcock, judged by its behavior in leafing and blooming in 1934, 1935, 1936, and 1938, when prolonged dormancy was more or less serious in susceptible varieties (figs. 1 and 2). The average weight per fruit of a very heavy crop was about 4.3 ounces.

One of the selected seedlings from the earlier breeding work was a white-fleshed clingstone, BH 102-8-39, an F_2 seedling from Columbiana $\times$ Peento. Its chilling requirement was only slightly more than that of the Peento-type parent. In F_1 from Elberta $\times$ BH 102-8-39, a large-fruited, handsome white clingstone, 11-5, occurred. The cross J. H. Hale $\text{♀} \times$ 11-5 ♂ gave a family of 11 plants including the variety Rosy and another promising seedling.

Tree.—Size, medium; vigorous; slightly spreading; twigs of current year's growth reddish purple and green.

Leaf.—Leaf fall medium late; apex broadly acute; base obtuse; lamina width (relative to length) medium, flat, or slightly folded, wavy, and slightly to medium crinkled; upper surface glossy, medium-dark green; glands large, fairly numerous, reniform.

Flower.—Small; nearly uniform deep rose-pink (Ridgway 71 d); male fertile.

Fruit.—Ripens in midseason; keeps well; medium large to large; round, bulging on the ventral side, slightly compressed laterally (not dorsiventrally); cavity about

⁸ Blake, M. A. Progress in peach breeding. Amer. Soc. Hort. Sci. Proc. 35(1937): 49-53. 1938.

⁹ Sefick, H. J., and M. A. Blake. The classification of varieties of peaches by means of leaf characters. Amer. Soc. Hort. Sci. Proc. 35(1937):246-250. 1938.

¹⁰ Ridgway, R. Color standards and color nomenclature. 43 p. 53 color plates. Published by the author, Washington, D. C. 1912.

1.1 cm deep, wide, flaring; suture very shallow, occasionally deeper near the apex on the dorsal side, occasionally scarred; twig mark usually not deep; apex medium in size, mamnillo-mucronate, slightly compressed; color creamy white, partly speckled with bright red, mottled, and slightly splashed with deeper red; pubescence short, medium dense; skin medium thick and tough, nonadherent; flesh creamy white with a little red, bright red near the pit, sweet, subacid, very juicy, firm-melting, slightly bitter; aroma pleasing; quality very good.

Stone.—Free; medium small; very broadly ovate in lateral view, bulging on the dorsal side, flattened at the base; about 3.25 cm long, 2.3 cm wide, 1.7 cm thick; point short, sharp; pits and grooves especially numerous, relatively deep; ventral suture medium wide, very slightly winged; dorsal suture¹¹ often deeply grooved, slightly winged.

Use.—Fresh, and home canning.

GOLDEN STATE

This peach (plates 1, B, and 3) is a yellow-fleshed freestone, pleasing in appearance, firm-melting in texture, and notable for its large size and good quality. It should prove a useful dessert peach, either for shipping or home use. Golden State requires less chilling than varieties of the North China group but distinctly more than the varieties Babcock and Rosy. At Riverside, it ripens a few days earlier than Elberta and produced a light crop of good quality even in 1934, when Elberta failed totally. In 1938 the fruit tended to drop rather too readily after reaching maturity, but this may have been because of its exceptionally large size.

One of the best in quality of the seedlings obtained from the earlier work was BH7-7-4, a yellow-fleshed, saucer-shaped freestone, which originated in F₂ from Elberta × a Peento type. Paragon is a large-fruited, yellow-fleshed clingstone, introduced from New Zealand by the Division of Plant Exploration and Introduction of the United States Department of Agriculture and having distinctly less chilling requirement than Elberta. Golden State is an F₁ plant of Paragon × BH7-7-4.

Tree.—Vigorous; upright to somewhat spreading; twigs of current year's growth purplish brown and green.

Leaf.—Leaf fall early; apex acute, base broadly acute; lamina relatively narrow, slightly folded, wavy, and slightly crinkled; upper surface medium-dark green; glands not numerous, large, reniform.

Flower.—Very small; nearly uniform thulite-pink (Ridgway 71'd); male fertile.

Fruit.—Ripens in midseason; large; shape regular, slightly oblong, very slightly compressed laterally; halves nearly equal; cavity about 1.3 cm deep, wide; suture shallow, usually deeper near the apex and distinctly so on the ventral side near the base; apex medium to small in size, mamnillo-mucronate; color yellow, partially speckled with red, mottled, and occasionally splashed with darker red; pubescence

¹¹ The so-called "dorsal suture" of fruit and seed is the midrib of the single carpel that forms the gynoeceum.

dense, coarse; white dots on some fruits; skin medium thick, medium tough, nonadherent; flesh rich yellow, with red color near the stone sometimes extending into the flesh, juicy, firm-melting, very sweet, slightly acid, slightly bitter; aroma similar to Elberta; quality good.

Stone.—Free; size medium; ovate in lateral view, base very slightly compressed; about 3.8 cm long, 2.4 cm wide, 1.8 cm thick; point medium long; pits and grooves fairly numerous, medium deep; ventral suture narrow, deeply grooved, very slightly winged; dorsal suture slightly to medium winged.

Use.—Fresh, and home canning.

RAMONA

Ramona (plate 4) is a yellow-fleshed, clingstone peach, suitable for canning. It matures late—usually in early or mid-September, at Riverside. This peach seems to be a vigorous grower and very productive. The fruit is large, and the flesh is non-melting or tough in texture and deep yellow in color, with very little red at the pit. In commercial canning tests its color, shape, and quality in the can were excellent; but in some fruits small pieces of hard stone-like tissue occurred in the flesh of the apex. At Riverside it has shown an undesirable tendency to polycarpy or the formation of double fruits.

Ramona originated in F_2 from Peak $\times$ F.P.I. 32374. Peak is a mid-summer clingstone, grown in California for canning and similar to Elberta in chilling requirement. F.P.I. 32374 is a yellow clingstone of rather small size, derived from a pit collected by G. Onderdonk in Mexico. It requires much less chilling than Elberta and probably very little more than Babcock. An F_1 plant, designated as 7-2, was intermediate but more like F.P.I. 32374 in chilling requirement. In F_2 , seedling 7-2-4 was the least susceptible to prolonged dormancy and produced a light crop at Riverside even in 1934, when Phillips failed to bloom. This F_2 plant, 7-2-4, or Ramona, was distinctly less susceptible than its F_1 parent, 7-2. This indicates that the genes in F.P.I. 32374 causing low chilling requirement are not completely dominant.

Tree.—Large; vigorous; upright to slightly spreading; productive; twigs of current year's growth reddish purple with some green.

Leaf.—Leaf fall medium late; apex broadly acute; base obtuse; lamina flat or slightly folded, slightly crinkled; upper surface medium-dark green; glands not numerous, globose.

Flower.—Small; color nearly uniform between thulite and cameo pinks (Ridgway 71'e); male fertile.

Fruit.—Matures late; keeps well; adheres to tree after full maturity; large; very slightly oblate; halves equal or nearly so; cavity about 1.3 cm deep, medium wide, flaring; suture shallow, distinct, often deeper at the base on the ventral side and on both sides of the apex; apex small to medium in size, mucronate, slightly depressed and flattened, straight or slightly curved; color yellow, slightly speckled, and occa-

sionally splashed with red; pubescence medium dense, medium coarse; white dots abundant; skin medium thick, tough, adherent; flesh deep yellow, a little red near the pit, not juicy, tough, nonmelting, sweet, subacid, not bitter; quality after cooking very good.

Stone.—Clinging; medium small; about 3.4 cm long, 2.5 cm wide, 2.0 cm thick; short-pointed but sometimes prolonged outwards into the flesh as small disjointed hard fragments; slightly compressed at the base; surface rough, numerous medium-deep furrows and some pits; ventral suture medium wide, slightly winged; dorsal suture medium wide, deeply grooved; basal attachment area oval.

Use.—Commercial and home canning.

HERMOSA

Hermosa (plate 5) is a white-fleshed freestone; it closely resembles Babcock, which is one of its parents, in appearance and in flavor but it ripens in midseason. The fruit is attractive in appearance and predominantly sweet in taste with little acidity. It may attain large size and seems to be firmly attached to the tree when ripe, and it keeps well. Hermosa probably requires slightly more chilling than Babcock and about the same amount as Rosy. The original seedling tree has been prolific. It originated in 1933 in F_1 from J. H. Hale $\times$ Babcock, and was given the serial number 98-1.

Tree.—Vigorous; upright; twigs of current year's growth reddish brown and green.

Leaf.—Leaf fall early; apex broadly acute, base broad; lamina slightly folded, wavy and slightly crinkled; upper surface light green; glands large, reniform.

Flower.—Large; uniform rose pink (Ridgway 71f); male fertile.

Fruit.—Ripens in midseason; keeps well; medium large; slightly oblong and cordate, not compressed laterally; cavity about 1.4 cm deep, flaring; absciss scar medium small; ventral suture shallow sometimes deeper at the base; dorsal suture sometimes perceptible as a broad shallow depression; twig mark seldom conspicuous; apex a small mammilla, grooved and slightly compressed laterally; color creamy white suffused with red, seldom mottled or streaked; pubescence medium in amount; skin thick, tough, semiadherent to the flesh; flesh nearly pure white, red next to the pit and radiating from it, sweet, very low in acidity, juicy, firm-melting, not bitter; aroma slight, pleasing; quality good.

Stone.—Free; small; ovate in lateral view, bulging slightly; distinctly flattened; about 3.7 cm long, 2.4 cm wide, and 1.8 cm thick; point short, sharp; pits medium in number; grooves many, deep; ventral suture medium in width, decidedly grooved; dorsal suture sometimes deeply grooved, very slightly winged.

Use.—Fresh, and home canning.

SUNGLOW

Sunglow (plate 6) is a freestone which ripens in midseason and is of good appearance. Its special merits are that it has an attractive orange-yellow flesh, a firm but fine nonfibrous texture and an agreeable flavor as fresh fruit. In 1937 and 1938, the original tree produced heavy crops

of fruit, rather small in size, but in 1939 it produced a good crop of large-sized fruit. Sunglow probably requires more winter chilling than Babcock and about the same amount as Ramona.

A cross made in 1929 between J. H. Hale and a seedling of Bolivian Cling, a variety of the Spanish group, gave a large yellow-fleshed free-stone hybrid. Self-pollination of this hybrid in 1933 gave twenty seedlings, one of which has been named Sunglow. Its serial number is 50-1-13.

Tree.—Vigorous; somewhat spreading; twigs of current year's growth reddish brown and green.

Leaf.—Leaf fall medium early; apex and base broadly acute; lamina slightly folded and wavy, very slightly crinkled; upper surface medium light green, often silvery; glands medium in size and number, reniform.

Flower.—Small; nearly uniform spinel pink (Ridgway 71'b); male fertile.

Fruit.—Ripens in midseason; size medium; slightly oblong, very slightly cordate, slightly compressed dorsiventrally; cavity about 1.2 cm deep, abrupt, flaring along sutures; absciss scar small, ventral suture shallow, often much deeper at the base; twig mark usually inconspicuous; apex small, mammillate, conical or slightly compressed; color deep yellow suffused, and occasionally mottled and streaked, with dull red; ventral suture often red; pubescence short, not dense; skin medium thick and tough, slightly adherent; flesh orange yellow, red near the pit, sweet, subacid, juicy, firm-melting, not bitter; aroma slight, rather pleasing; quality very good.

Stone.—Free; the apical portion usually separated from the flesh by a cavity; ovate, bulging decidedly; only slightly flattened at the base; about 3.7 cm long, 2.3 cm wide, 1.7 cm thick; point medium in length, sharp; grooves few; pits more numerous, medium deep; ventral suture medium in width, slightly winged, distinctly grooved; dorsal suture slightly winged, usually deeply grooved.

Use.—Fresh, and home canning.

